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FERGUS

SEWAGE TREATMENT PLANT

ANNUAL REPORT

1960

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PREPARED BY

THE DIVISION OF PLANT OPERATIONS

ONTARIO WATER RESOURCES COMMISSION

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FERGUS SEWAGE TREATMENT PLANT

ANNUAL REPORT FOR 1960

DESCRIPTION OF PLANT

General Description

The Fergus Sewage Treatment Plant is an activated sludge type using mechanical aeration. The 12 hour design flow is 600,000 Imperial gallons per day, which will treat the sewage from 4700 persons at a flow of 128 Imperial gallons per capita per day.

INLET SEWER

There is an 18" diameter sewer which runs through an overflow chamber beside the two existing septic tanks. Excess flow in the inlet sewer overflows a weir and runs into the two septic tanks.

SEPTIC TANKS

The two existing tanks are 36' x 22' x 10' deep and are used to provide partial treatment to the storm flow. The effluent from these tanks is discharged to the chlorine contact chamber and then to the river.

COARSE BAR SCREEN

A coarse bar screen is located in the overflow. This unit has 1" x ¼" bars at 4" centers to screen out large objects from the sewage.

BARMINUTOR

The sewage which enters the plant passes through an 18" Barminutor which cuts and shreds the solid material.

GRIT REMOVAL

Inorganic material such as sand, grit, etc. is mechanically removed from the sewage by a Dorr-Oliver Type T detritor. This unit has a manually cleaned bypass channel in case the mechanism breaks down.

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FLOW MEASUREMENT

After grit removal the raw sewage passes through a 6" Parshall flume, which records the rate of flow and total flow for each day.

PRIMARY SEDIMENTATION TANK

The primary sedimentation tank is 40' square with a 9' side wall depth equipped with a Dorr-Oliver rotary scraper mechanism. The volume of the tank is 14,400 cubic feet which gives a detention time for 3.6 hours.

The function of this tank is to separate the solids from the incoming sewage by allowing them to settle to the bottom of the tank while the settled sewage flows over the effluent weirs.

The primary tank is oversized to accomodate the peak flows which occur in the spring. A bypass channel is provided around the primary tank. The outlet chamber from this tank is provided with an overflow weir to divert the flow in excess of 0.9 M.G.D. to the effluent sewer.

AERATION TANK

The aeration tank consists of 3 units, each 24' square x 10'-8" S.W.D. with a total volume of 22080 cubic feet, which provides a detention period of 4.41 hours at a flow rate of 0.6 M.G.D. Each unit is provided with a high intensity mechanical aeration cell using the British Simplex Aeration Process.

FINAL SEDIMENTATION TANK

The final sedimentation tank is 35' square with a 9' side wall depth equipped with a Dorr-Oliver rotary scraper mechanism. The volume of the tank is 11,025 cubic feet, which gives a detention time of 2.2 hours at a flow rate of 0.6 M.G.D. with 25% return sludge.

PUMP BUILDING

The main building at the plant houses the combined office and laboratory, the chlorination room, a washroom and a pump room.

The following pumps are located in the pump room:

(a) One 150 G.P.M. Fairbanks Morse centrifugal raw sludge pump equipped with a 5 H.P. electric motor. This unit pumps raw sludge which is settled out in the primary sedimentation tank over to the digester.

(b) One 350 G.P.M. Fairbanks Morse centrifugal return sludge pump equipped with a variable speed drive and an electric motor. This pump is used to return the activated sludge from the bottom of the final sedimentation tank to the aeration tank.

(c) One 350 G.P.M. Fairbanks Morse centrifugal return sludge pump equipped with a variable speed drive and an electric motor. This is a standby unit.

DIGESTER

The heated digester is 35' diameter x 22' S.W.D. having a volume of 22,700 cubic feet. This volume allows for a capacity of 4.8 cubic feet per capita. The digester is equipped with a Dorr-Oliver floating cover and a draft tube mixer. The sludge in the digester is heated by a Pacific Flush tank heat exchanger which is located in the digester building.

The sludge in the digester is heated to a temperature of 90° F, and it is broken down by bacterial action into (1) thick, black, odorless digested sludge (2) a relatively clear supernatant liquor which is returned to the aeration tank and (3) digester gas which is used in the heat exchanger to heat the digester. Standby fuel is oil. The digested sludge is run out on sand beds for drying and later disposal as a soil conditioner.

SLUDGE DRYING BEDS

There are four sand sludge drying beds each 80 feet long x 22½ feet wide, having a total area of 7,200 square feet.

CHLORINATION

A 200 lb/24 hour capacity Builders Providence gas chlorinator is located in the end of the main building.

Chlorine is injected into the outlet chamber of the final sedimentation tank. The chlorinated effluent flows to a chlorine contact chamber located near the outlet of the existing septic tanks.

The volume of the chlorine contact chamber is 911 cubic feet, which gives a contact period of 13.7 minutes.

The final effluent is discharged to the Grand River through a 30" outfall sewer.

FERGUS SEWAGE TREATMENT PLANT

OPERATING BUDGE FOR 1961

STAFF PAYROLL		
R. Bridge	3750	
A. Carlaw	3480	
Total	7230	$ 7,230
FUEL OIL REQUIREMENTS		
Heating at plant - Estimate 3,000 gallons		
16.2 ¢ per gallon		
Total fuel estimates		$ 490
POWER		
Estimate $120 per month x 12 months		$ 1,440
CHEMICAL		
Effluent chlorination		
Estimate 10 lbs. per day 170 days per year		
Total of 1700 lbs.		
Cost = $\frac{1700}{100}$ x $14		$ 238
Polycide, chloride of lime, etc.		$ 100
Total chemical cost		$ 338
GENERAL SUPPLIES		
Brooms, soap, stationery, brushes, lab chemicals, etc.		
$25 per month x 12 months = $300		$ 300
EQUIPMENT		
Minor new equipment, packing glands, tools		
$15 per month x 12 months = 180		$ 180

REPAIRS & MAINTENANCE

Repairs and maintenance on existing equipment

$10 per month x 12 months $ 120

SUNDRY

Telephone, shipping charges, postage, etc.

$20 per month x 12 months $ 240

Total $10,338

INSURANCE

A three year premium for the period covering from July 1960 to July 1963.

Estimated to be billed in 1961. $ 1,000

LANDSCAPING

Complete landscaping of the plant site should be done during the summer of 1961. It is hoped that all of the money required for this purpose can be billed against the capital cost for the project. The purchase of a lawnmower should be included in the total bill.

LABORATORY RESULTS

		BOD INFLUENT	BOD EFFLUENT	% REDUCTION	S.S. INFLUENT	S.S. EFFLUENT	% REDUCTION
Aug.	22	195	30	84.6%	180	14	92.1%
	30	210	15	92.9	204	20	90.2
Sept	7	260	16	93.9	218	16	92.7
	12	300	21	93.0	138	14	89.8
	19	235	25	89.4	148	8	94.6
	26	165	27	83.6	272	36	86.8
Oct.	3	245	14	94.3	186	30	84.0
	10	250	42	83.1	138	14	89.9
	17	225	24	89.4	328	10	97.0
	24	-	14	-	-	10	-
Nov.	7	230	23	90.0	344	32	90.7
	14	280	6	97.8	462	14	97.0
	21	200	17	91.5	384	12	97.0
	28	160	14	91.2	352	20	94.5
Dec.	5	265	30	88.7	372	20	94.6
	12	195	26	86.7	212	26	97.9
	19	350	22	93.6	316	40	87.4
	27	200	38	81.0	424	38	91.2
AVG.		233	23	89.7	275	21	91.6

OPERATING RESULTS

1960

PERIOD	AVG. DAILY FLOW M.G.D.	AVG. DAILY MAX. M.G.D.	AVG. DAILY MIN.	TOTAL FLOW M.G.	GRIT REMOVED CU. FT.	SLUDGE REMOVED GALS.	GAS PRODUCED CU. FT.	OIL CONSUMED GALS.	POWER CONSUMPTION K.W.H.
Nov. 1-4	.20	.36	.05	.78	-	9600	-	193	1400
Nov. 5-11	.18	.29	.05	1.22	4	4200	-	155	2100
Nov. 12-18	.25	.50	.09	1.73	6	10800	-	160	2490
Nov. 20-26	.18	.24	.05	1.25	4	5400	-	145	2460
Nov. 27-3	.17	.23	.05	1.16	6	4200	23857	155	2580
Dec. 4-10	.17	.21	.05	1.15	-	4200	49535	178	2805
Dec. 11-17	.16	.20	.05	1.10	2	4200	10214	140	2760
Dec. 18-24	.16 E	.20 E	.05 E	1.10 E	-	4200	8835	185	2670
Dec. 25-31	.16 E	.20 E	.05 E	1.10 E	4	4200	12701	120	2505
TOTAL				10.59	26	51000	105142	1431	21770

* E - Estimated

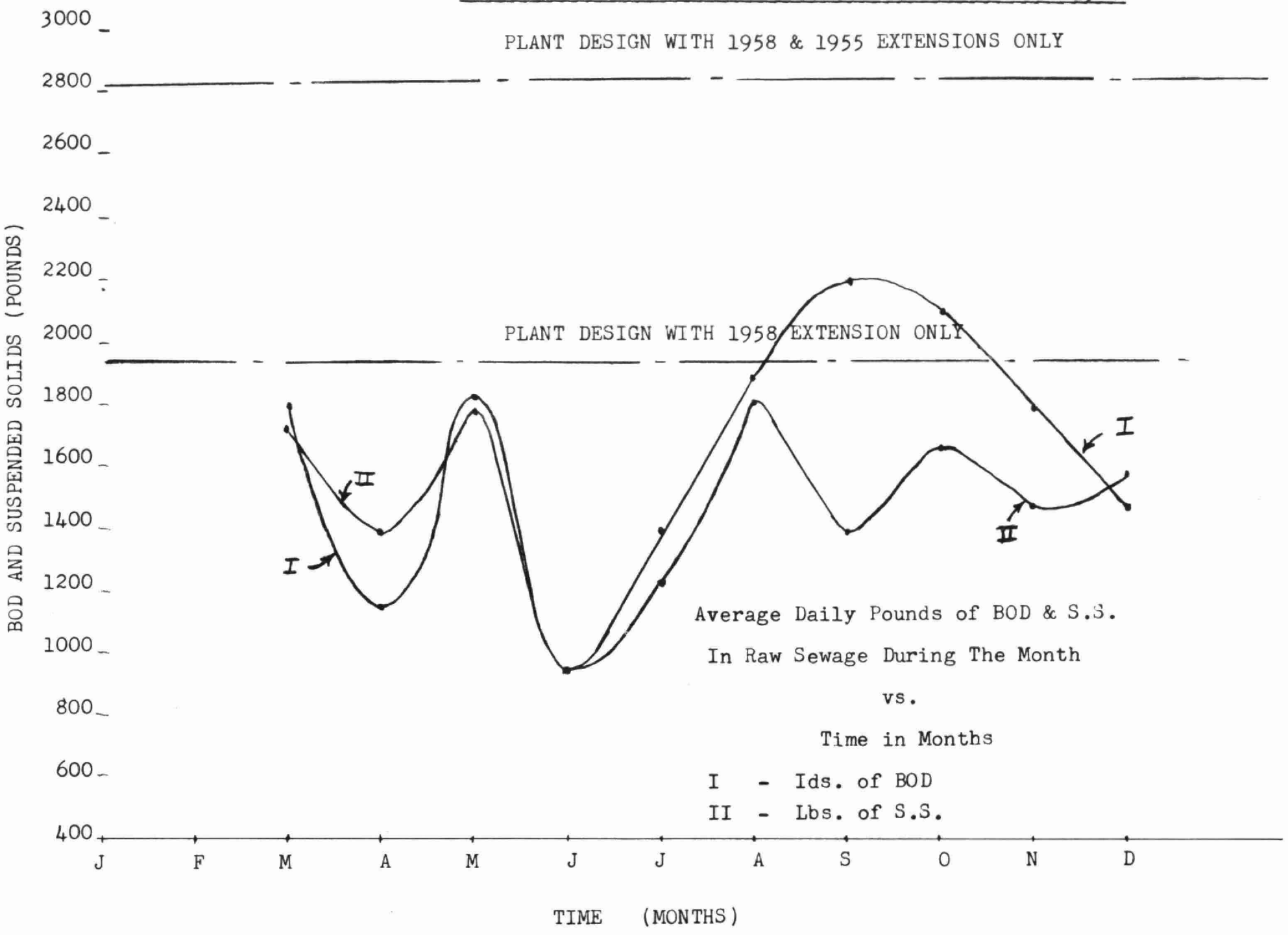
FERGUS OPERATING COSTS 1960

MONTH	EXPENDITURE	PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	MAINTENANCE	HAULAGE	SUNDRY
JUNE	40.28					6.21				34.07
JULY	583.21	452.08		124.38						6.75
AUG.	657.67	464.37	8.05	99.94		68.39				16.92
SEPT.	770.50	279.81		123.19	290.19	62.86				14.45
OCT.	1295.83	809.35	122.66	157.81		125.87				80.14
NOV.	687.72	535.38		113.50		27.54				11.50
DEC.	1463.15	803.07	292.43	108.43	4.20	222.90				31.70
TOTAL	5498.36	3344.06	423.14	727.67	294.39	513.57				195.53

Graph #2

RICHMOND HILL SEWAGE TREATMENT PLANT

POUNDS OF BOD AND SUSPENDED SOLIDS IN RAW SEWAGE 1960



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